

Working at NASA

Adam Harding

Aerospace Engineer

NASA - Dryden Flight Research Center

Stuff To Talk About Today



- Adam's Background
- NASA Dryden Overview
- My Projects at NASA
- Closing Thoughts
- Questions

Adam's Background – School & Work



- Viewmont HS – 1993
- BS in Mech. Eng. from THE University of Utah – 2002
- Masters in ME from The U of U – 2005
- Worked at Hill AFB in Ogden Utah from 2003 to 2007.
 - Palace Acquire Internship
- Transferred to NASA Dryden in 2007.



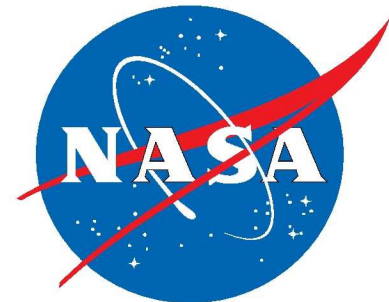
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U.S. AIR FORCE [3]



Adam's Background – Motivation



- Why did I become an engineer?
- What got me interested in Space?
- Was it easy?

Adam's Background – Air Force Work



- 2003 – 2007
- Aerospace Engineer for the A-10 Aircraft
 - Designed repairs for Battle Damage
 - Reversed Engineering of Obsolete Parts
- Palace Acquire Internship



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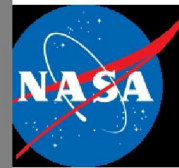


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To Fly What Others Only Imagine



Advancing Technology and Science Through Flight



- **Mission Elements**

- Perform flight research and technology integration to revolutionize aviation and pioneer aerospace technology
 - Validate space exploration concepts
 - Conduct airborne remote sensing and science observations
 - Support operations of the Space Shuttle and the ISS
- ... for NASA and the Nation

Orion
Development



Airborne Science
Operations



Revolutionary
Aeronautical Concepts



STS Operations

Dryden Flight Research Center

Edwards Air Force Base



- Remote Location
- Varied Topography
- 350 Testable Days Per Year
- Extensive Range Airspace
- 29,000 Ft Concrete Runways
- 68 Miles of Lakebed Runways
- 301,000 Acres
- Supersonic Corridor

Dryden Aircraft Operations Facility

Palmdale, CA



- USAF Plant-42
- Palmdale Site 9 Complex
 - Ready access to USAF Plant 42 runway and facilities
 - 35 miles from NASA Dryden Flight Research Center



NASA Space Operations

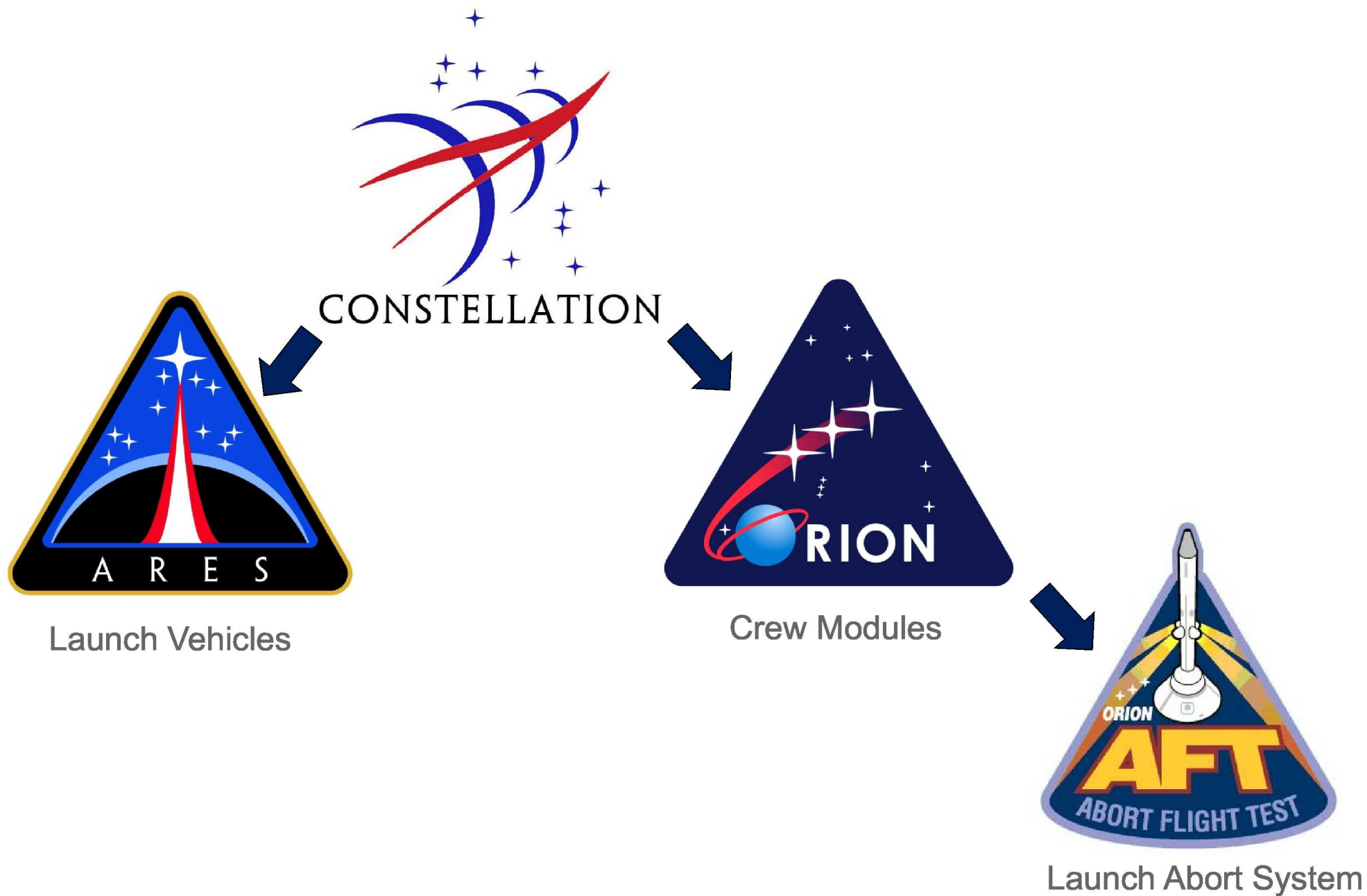
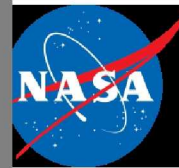


- Primary alternate landing site
- On-orbit communications support for International Space Station (ISS) and Shuttle Orbiter
- Telemetry support
- Shuttle Carrier Aircraft (SCA) maintenance and support
- 60 DFRC landing operations to date
 - Last landing operation STS-125, May 2009

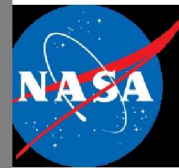
My Projects at NASA



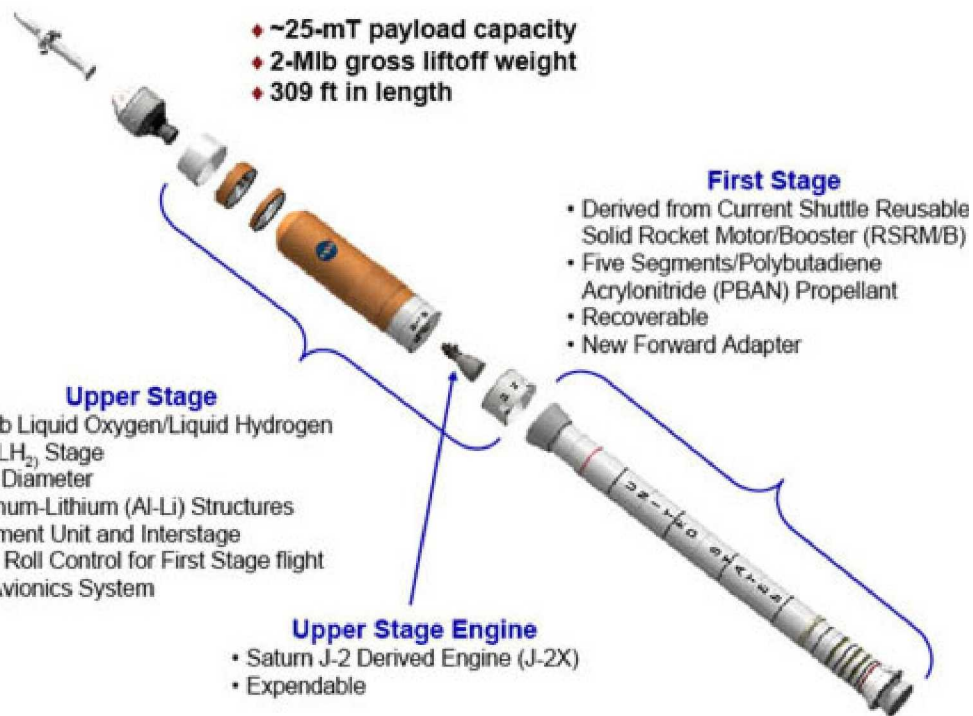
CEV – Program Architecture



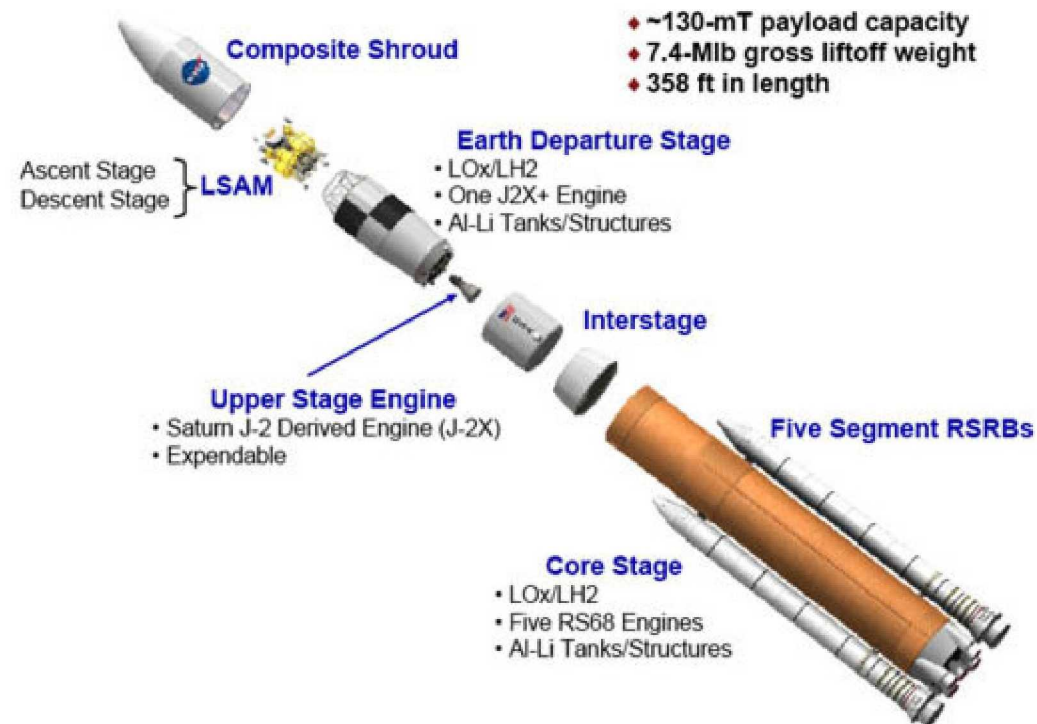
CEV – Program Architecture



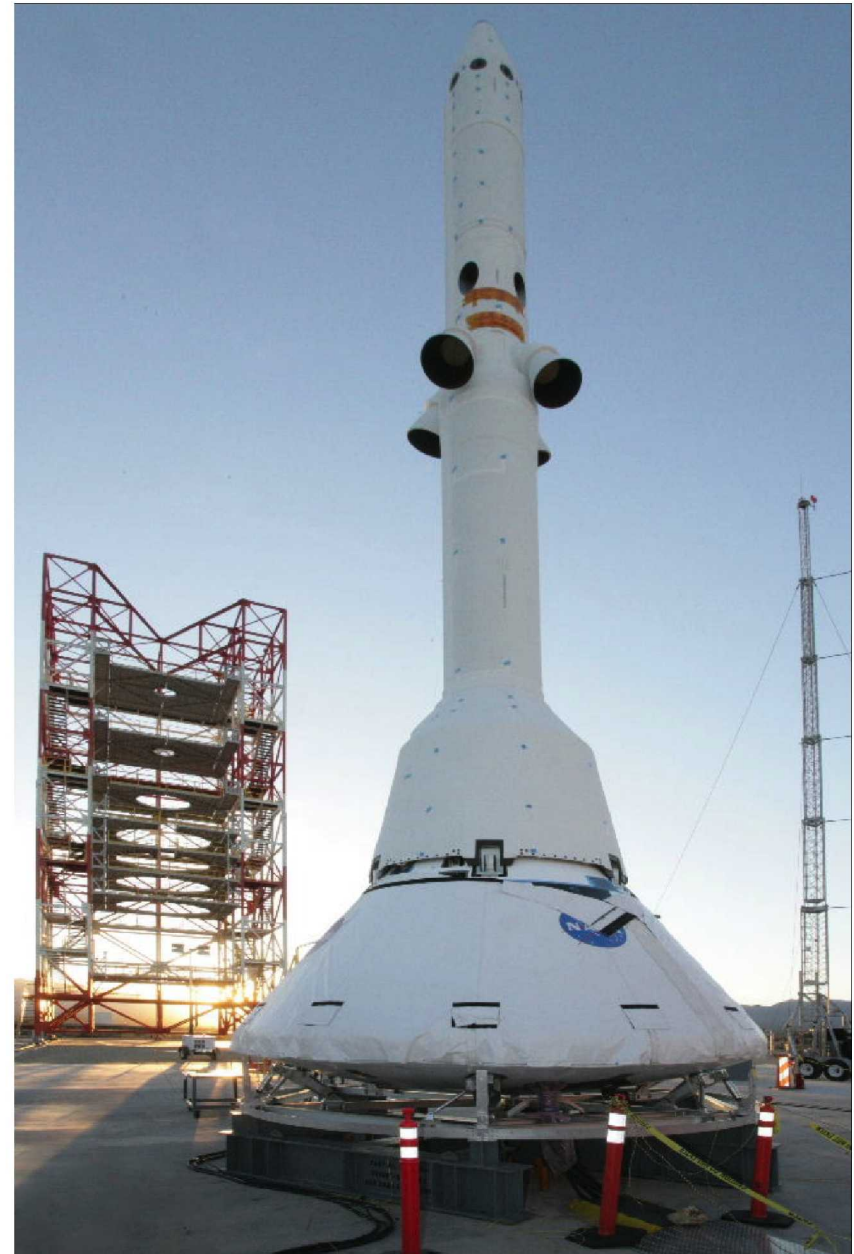
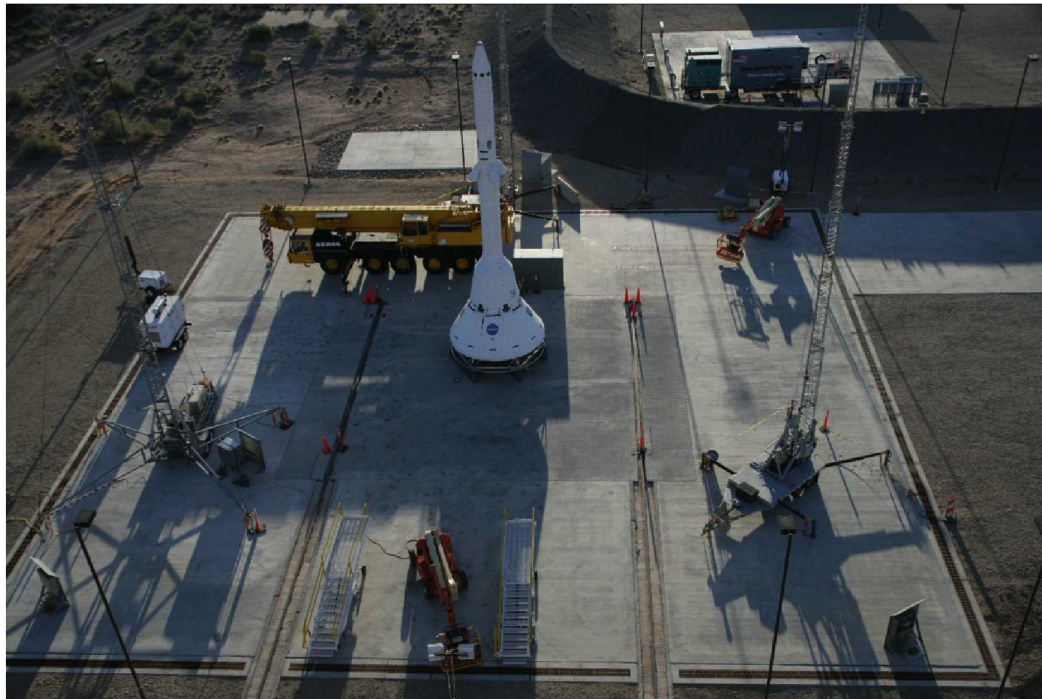
Ares I Crew Launch Vehicle



Ares V Cargo Launch Vehicle



CEV – Program Architecture



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CEV – Testing

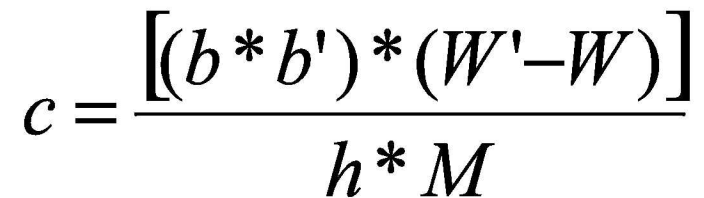


Center of Gravity (CG)





$$\bar{z} = \frac{\sum_i (load * zcoord)}{\sum_i (load)}$$



$$\bar{x} = xcoord - c$$

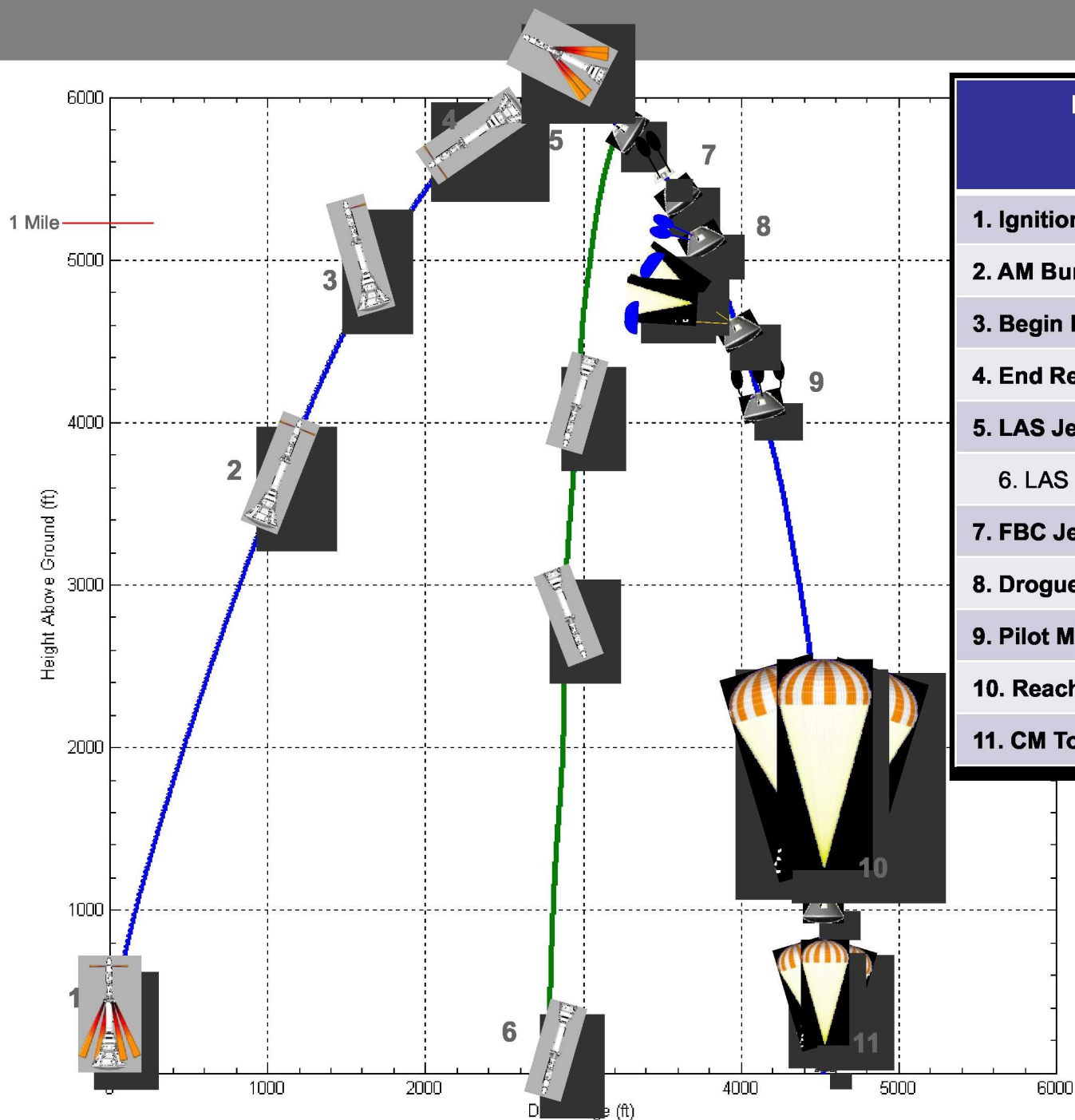
CEV – Testing



Inertia Testing

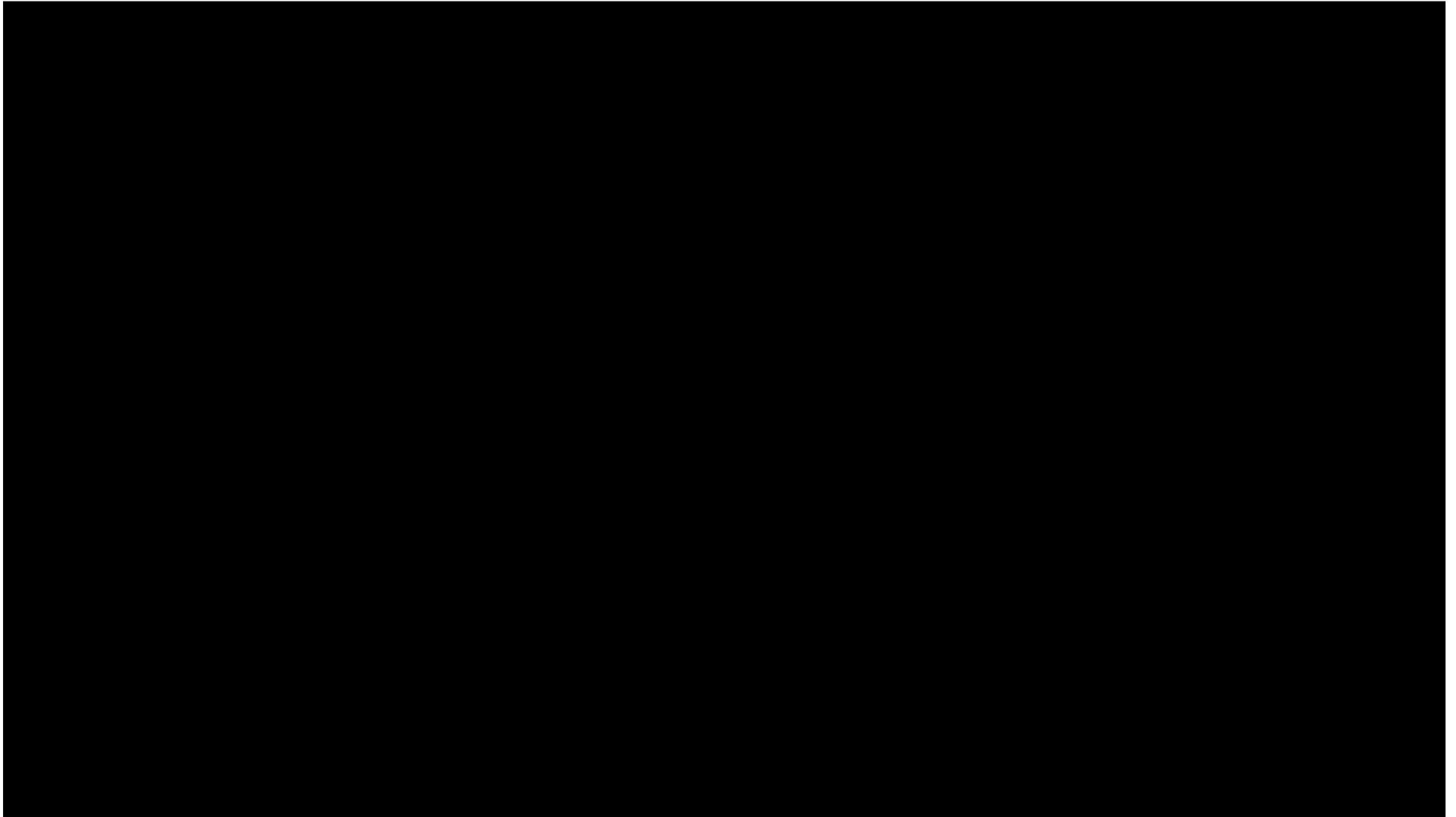


PA-1 Mission Overview



Event	Time Past AM Ignition Command (seconds)
1. Ignition	0.00
2. AM Burnout	6.45
3. Begin Re-Orientation	10.05
4. End Re-Orientation	15.77
5. LAS Jettison	21.03
6. LAS Touchdown	49.32
7. FBC Jettison	22.02
8. Drogue Mortar Fire	24.56
9. Pilot Mortar Fire	30.56
10. Reach 33 ft/sec	52.54
11. CM Touchdown	96.83

My Projects at NASA – PA-1 Launch



My Projects at NASA - SCRAT



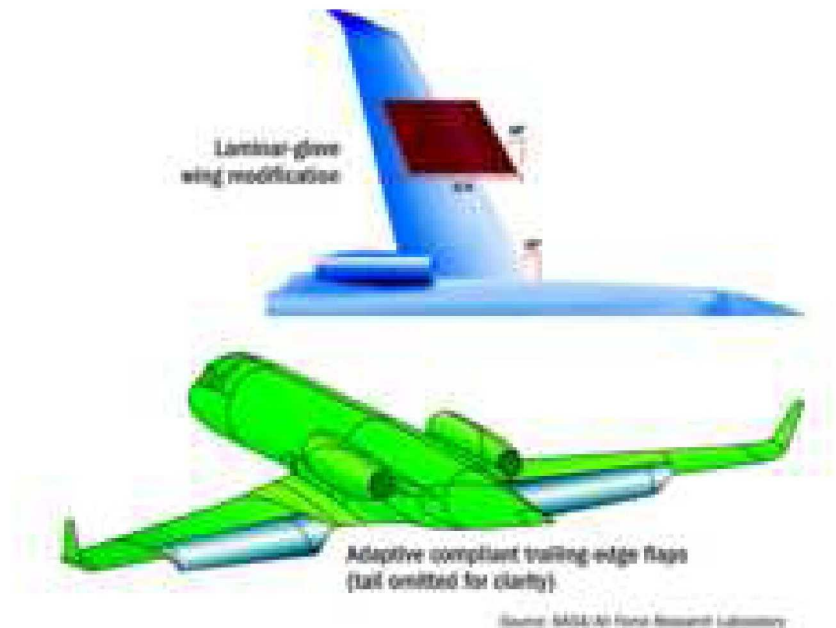
SCRAT Project Summary



- SCRAT is funded by NASA's Environmentally Responsible Aviation (ERA)
- Currently two projects in work that will be flown on the NASA Gulfstream III.
 - Subsonic Aircraft Roughness Glove Experiment (SARGE)
 - Adaptive Compliant Trailing Edge (ACTE)



NASA Dryden G-III



Closing Thoughts – Your Future



- Work Hard:
 - Let us realize that the privilege to work is a gift, that power to work is a blessing, that love of work is success.
--David O. McKay
- Math: Take every Calculus class possible.
- The job that you retire from may not yet be invented.
- Never be the one to tell yourself no.

Your Equation:



**Engineering
Academy**



**College
Degree**



**Awesome
Career**



Questions

References / Sources



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- [4] <http://op-for.com/A10.jpg>
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- [6] <http://img528.imageshack.us/img528/7712/a10thunderbolt3bx9.jpg>
- [7] "Dryden Flight Research Center, Center Overview", David McBride, Center Director, PowerPoint Presentation: Dryden 101.ppt
- [8] http://www.flashespace.com/icones/juin06/ares1_5.jpg
- [9] "Pad Abort 1 FTRR April 22, 2010", Cathy Bahm, PA-1 Deputy Program Manager, Presentation: 00_FTRR_v1.pptx
- [10] "Pad Abort 1 Abort Flight Tests Overview & System Readiness", Donald Reed, Manager Orion Flight Test Office, Presentation: 04_AFT_Status_v4-17-10.ppt.
- [11] "NASA Gulfstream III To Conduct Novel Adaptive-Wing Trials", Guy Norris, Aviation Week & Space Technology Mar 08, 2010, p. 51
- [12] <http://avdistrict.org/our-schools/knight-high-school/school-information>

